...udent and teacher: Use this cover sheet for mailing or faxing.

ASSIGNMENT BOOKLET

9110 Mathematics 9
Module 2

FOR STUDENT USE ONLY	
Date Module Submitted: _____	(If label is missing or incorrect) File Number: _____
Time Spent on Module: _____	Module Number: _____

FOR TEACHER USE ONLY

Assigned Teacher: _____

Module Grading: _____

Graded by: _____

Date Module Received:

_____

Module Assignment Recorded: _____

Student's Questions and Comments

Apply Module Label Here

Name

Address

Postal Code

Please verify that preprinted label is for correct course and module.

Teacher's Comments

_____
Teacher

These instructions are for students registered with the Alberta Distance Learning Centre.

INSTRUCTIONS FOR SUBMITTING THIS DISTANCE LEARNING ASSIGNMENT BOOKLET

When you are registered for distance learning courses, you are expected to submit Assignment Booklets for correction regularly. Try to submit each Assignment Booklet as soon as you have completed it. Do not submit more than one Assignment Booklet in one subject at the same time. Before submitting your Assignment Booklet, please check the following:

- Are all the assignments completed? If not, explain why.
- Has your work been reread to ensure accuracy in spelling and details?
- Is the booklet cover filled out and the correct module label attached?

MAILING

1. Postage Regulations

Do **not** enclose letters with Assignment Booklets.

Send all letters in a separate envelope.

2. Postage Rates

Take your Assignment Booklet to the post office and have it weighed. Attach sufficient postage and seal the envelope. Assignment Booklets will travel faster if sufficient postage is used and if they are in large envelopes that do not exceed two centimetres in thickness.

FAXING

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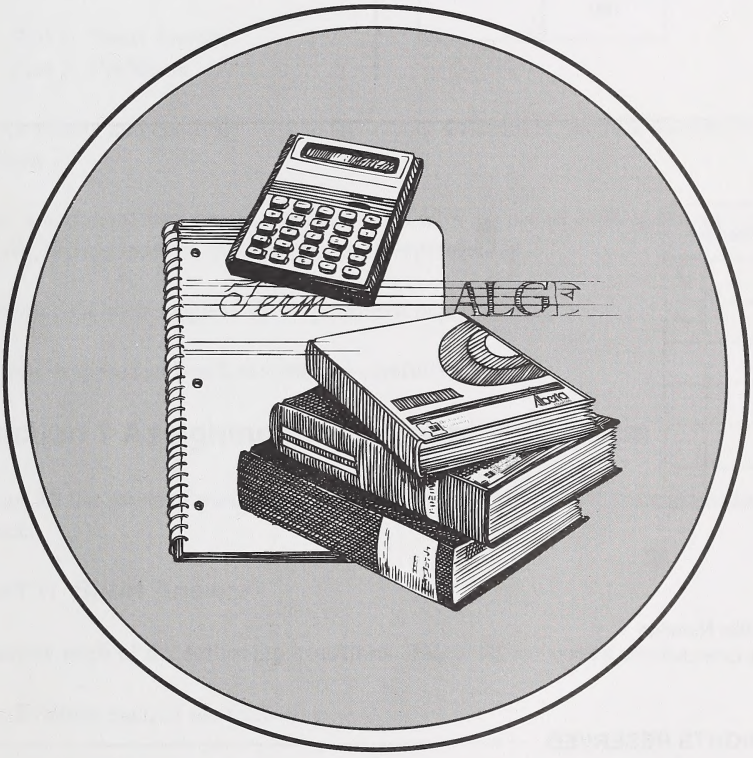
MATHEMATICS 9

MODULE 2



Exponential and Scientific Notation

ASSIGNMENT BOOKLET

Distance Learning

Alberta EDUCATION

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Section 1 Assignment	35	
Section 2 Assignment	25	
Final Module Assignment	40	
	100	

Teacher's Comments

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Parents	
General Public	
Other	

Mathematics 9
Assignment Booklet
Module 2
Exponential and Scientific Notation
Learning Technologies Branch
ISBN 0-7741-1278-6

ASSIGNMENT BOOKLET
MATHEMATICS 9 – MODULE 2: EXPONENTIAL AND SCIENTIFIC NOTATION

Your mark on this module will be determined by how well you do your assignments in this booklet.

There are two section assignments and one final module assignment in this assignment booklet. The total value of these assignments is 100 marks. The value of each assignment is stated in the left margin.

Each assignment has two parts:

Part 1: Short Answer
Part 2: Problems

Work slowly and carefully. If you are having difficulties, go back and review the appropriate section.

This assignment booklet may be completed with the use of a calculator and resource materials. However, you must do the assignment **independently**.

You may do your rough work on your own paper.

Be sure to proofread each assignment carefully.

(35)

Section 1 Assignment: Exponential Notation

Read all the parts of your assignment carefully and record your answers in the appropriate place.

Part 1: Short Answer

Answer each of the following questions. Show all necessary work.

(6)

1. Evaluate each of the following.

a. 21^2

b. $\left(\frac{7}{8}\right)^3$

c. $(-1.7)^3$

d. $(-5)^4$

e. 2^{-5} **f.** 8^{0}

2. Write the exponential form of the following:

(1) **a.** $2\times2\times2\times2\times2$

(1) **b.** $(-8)\times(-8)\times(-8)\times(-8)$

(2) **3.** Use a calculator to find the missing exponent in each of the following.

a. $9^{\square} = 59\,049$ **b.** $(-5)^{\square} = 15\,625$

(2) **4.** Without evaluating, show which is greater, 36^{3} or 6^{5}.

(6)

5. Write each of the following as a single power.

a. $(-3)^4 \times (-3)^5$

b. $4^5 \times 2^3$

c. $\left(-\frac{3}{4}\right)^7 \div \left(-\frac{3}{4}\right)^{-2}$

d. $\left(3^2\right)^5$

e. $\left[(-2)^3\right]^4$

f. $\dfrac{\left(4^2\right)^3 \times 4^5}{4^7}$

6. Write out the keystroke sequence required to evaluate the following:

(2)

a. $24 - 4^2 \times 3$

(2)

b. $8 \div \left[3^4 - (-4-3)\right]$

(3) **7.** Perform the following operations.

a. $7^3 - 7^2 \times 2$

b. $(5-1)^2 - 3$

c. $\left(\frac{4^2+2}{2}\right)^2$

(2) **8.** Use patterns to explain why $10^0 = 1$.

Part 2: Problems

Show all the necessary work so it is clear how you arrived at your answer.

(2) **9.** Without evaluating, determine the last digit of 27^{18}.

10. Sometimes items are sold by the dozen, gross, and great gross. A gross is a dozen dozen, and a great gross is a dozen gross.

(1) **a.** How many items are in a gross?

(1) **b.** How many items are in a great gross?

11. A student wrote on a test that $8^5 \div 4^3 = 2^2$.

(1) **a.** What mistake did the student make?

(1) **b.** Express $8^5 \div 4^3$ as a single power.

(1)

12. a. Math is a study of patterns. Using the following differences between the squares of consecutive whole numbers, describe a pattern you see.

$1^2 - 0^2 = 1$

$2^2 - 1^2 = 3$

$3^2 - 2^2 = 5$

$4^2 - 3^2 = 7$

$5^2 - 4^2 = 9$

(1)

b. Without evaluating the powers, calculate the following. Show how you get your answer.

$729^2 - 728^2 =$

(25)

Section 2 Assignment: Scientific Notation

Read all the parts of your assignment carefully and record your answers in the appropriate place.

Part 1: Short Answer

Answer each of the following questions. Show all necessary work.

1. Write each of the following in expanded form using exponents.

(1)

a. 407 000 080

(1)

b. 9000.008 012

(3) **2.** Write each of the following in scientific notation.

a. 248 000 000

b. 0.000 000 099 2

c. 76 000 000 000 000

3. Do the indicated computation using the paper-and-pencil method, and write your answer in scientific notation.

(2) **a.** $\left(4.5\times10^{8}\right)\times\left(1.2\times10^{-6}\right)$

(2) **b.** $\dfrac{\left(1.6\times10^{-8}\right)\times\left(4.5\times10^{12}\right)}{1.8\times10^{-3}}$

4. Use the exponent function on a scientific calculator to calculate the following; then write your answers in scientific notation. Show the keystroke sequence you used.

(2) **a.** $\left(5.6\times10^{11}\right)\div\left(1.4\times10^{4}\right)$

(2) **b.** $\dfrac{\left(1\times10^{10}\right)\times\left(2\times10^{12}\right)}{5\times10^{22}}$

5. Write each of the following in standard form.

(1) **a.** 1.8×10^{8}

(1) **b.** 1.4×10^{-9}

(2) **6.** Kalina used her scientific calculator to find the product of 350 000 and 124 000. Her calculator displayed  as the answer. Write this number in scientific notation and in standard form.

7. Write the keystroke sequence that you would use to perform each of the following.

(2) **a.** $\left(3.14\times10^{3}\right)\times\left(7.51\times10^{-8}\right)$

(2) **b.** $\left(1.64\times10^{11}\right)\div\left(4.1\times10^{8}\right)$

Part 2: Problems

Show all the necessary work so it is clear how you arrived at your answer.

(2) **8.** In 1990, the planet Pluto was 4 290 000 000 km from Earth, closer than it had been in many years. How many years would it take the Voyager space probe to reach Pluto if it travels at a speed of 27 000 km/h? Round your answer to the nearest year.

(2) **9.** A report in a magazine article stated that about 100 billion aluminum beverage cans are made each year in North America. Suppose these cans are stacked one on the other. Explain how you could calculate the height of this stack (in kilometres) using a scientific calculator.

40

Final Module Assignment

Read all the parts of your assignment carefully and record your answers in the appropriate place.

Part 1: Short Answer

Answer each of the following questions. Show all necessary work.

8

1. Write the following in simplest exponential form.

a. $8^2 \times 8^3 \times 8^{-1}$

b. $\left(\frac{1}{2}\right)^4 \times \left(\frac{1}{2}\right)^2 \times \left(\frac{1}{2}\right)$

c. $\left(9^4\right)^2 \times \left(9^{-2}\right)^3$

d. $(1.4)^6 \div (1.4)^2$

e. $\dfrac{7^3 \times 7^2 \times 8^5}{8^4 \times 7 \times 8^{-8}}$

f. $14^{-3} \div \left(14^2\right)^4$

g. $\left(a^{-3} b^5 c^2\right)^2$

h. $\left(x^3 y^2 z^{-2}\right)^4$

(8) **2.** Write each of the following in simplest standard form.

a. $8^2 \times 8^{-4} \times 8^5$

b. $\left(\frac{2}{3}\right)^5 \div \left(\frac{2}{3}\right)^3$

c. $2^3 + 4^3$

d. $16^2 - 15^2$

e. 9.4×10^{-8}

f. $\left(8 \times 10^4\right) + \left(6 \times 10^1\right) + \left(7 \times 10^{-3}\right) + \left(2 \times 10^{-4}\right)$

g. 5^{-2}

h. the fourth power of 3

(8) **3.** Use the rules for powers and exponents to find the value of n in each of the following.

a. $4^n \times 4^5 = 4^7$

b. $\left(4^n\right)^3 = 4^{-6}$

c. $\left(5^n\right)^n = 625$

d. $(n)^{-2} = \left(\frac{1}{4}\right)^2$

e. $7^5 \times 7^n = 7^5$

f. $\left(\frac{2}{3}\right)^n = \frac{27}{8}$

g. $0.000\,000\,014 = 1.4 \times 10^n$

h. $1\,000\,000\,000 = n \times 10^9$

4. Write the following in scientific notation.

(1) **a.** 0.000 000 000 007 5

(1) **b.** 82 700 000 000

5. Use the exponent function on a scientific calculator to calculate the following; then write your answers in scientific notation. It is not necessary to show required keystroke sequence.

(1) **a.** $\left(7.2 \times 10^{14}\right) \times \left(1.4 \times 10^{-8}\right)$

(1) **b.** $\left(4.5 \times 10^{12}\right) \div \left(1.2 \times 10^{-4}\right)$

Part 2: Problems

Show all the necessary work so it is clear how you arrived at your answer.

(3) **6.** Explain how you can tell, without evaluating the powers, what the last digit of the following sum would be. Use examples where necessary to illustrate your explanation.

$11^5 + 12^5 + 13^5 + 14^5$

(2) **7.** Without evaluating the separate powers, calculate the product.

$2^{10} \times 5^{10}$

(2) **8.** Earth's atmosphere is a vast ocean of air, and therefore has considerable mass. In fact, it has been estimated to have a mass of about 5 700 000 000 000 000 t. The mass of the moon is approximately 73 800 000 000 000 000 000 t. How many times greater is the mass of the moon than the mass of Earth's atmosphere? Round your answer to the nearest thousand.

(2) **9.** Explain how you would use scientific notation with a scientific calculator to find the answer to the following. Include the required keystroke sequence in your explanation.

$237\,160\,000\,000\,000 \div 245\,000$

10. Spiders make strands of silk with a diameter of about 5.0×10^{-6} m. The diameter of a human hair is 1.0×10^{-4} m.

(2) **a.** How many times greater is the diameter of the human hair?

(1) **b.** If the cross-section of the spider silk is represented by the following circle, then what diameter of circle would you need to represent the cross-section of a human hair?

Cross-Section of Spider Silk

$d = 10$ mm

ASSIGNMENT BOOKLET DECLARATIONS

The Student's Declaration is to be filled in by a student registered at the Alberta Distance Learning Centre. If the student is under 16, the Learning Facilitator's Declaration is to be filled in by the learning facilitator. Failure to complete this page may invalidate the assignment results.

STUDENT'S DECLARATION

- I have followed the instructions outlined in the Student Module Booklet.
- I have completed the activities to prepare myself for the assignments in this Assignment Booklet.
- I completed the assignments in this Assignment Booklet by myself.

_____

Student's Signature

LEARNING FACILITATOR'S DECLARATION

I hereby certify that I have supervised the learning activities completed by _____.

Student's Name

I also certify that to the best of my knowledge the assignments in this Assignment Booklet were completed independently by this student.

_____

Supervisor's Signature

If you, the student or learning facilitator, have any comments or observations regarding this module, write them in the following space.

Mathematics 9
Assignment Booklet
Module 2

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